

PURPLE MARTIN (*Progne subis arboricola*)

Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
15	10	7.5	5	2.5	5	15

Special Concern Priority

Currently considered a Bird Species of Special Concern (breeding), Priority 1. Included on both the original list, Priority 2 (Rensen 1978), and CDFG's (1992) unprioritized list.

Breeding Bird Survey Statistics for California

Data inadequate for trend assessment (Sauer et al. 2000; but see Williams 1998).

General Range and Abundance

The Purple Martin is comprised of three subspecies: *P. s. subis*, an abundant breeder in eastern North America; *P. s. hesperia*, an uncommon and local breeder in the deserts of Arizona and Mexico; and *P. s. arboricola*, a rare and local breeder west of the Rocky Mountains. All subspecies apparently winter in South America. About 3000 pairs breed along the Pacific Coast (Western Purple Martin Working Group data), with about 1,200 estimated in California. Small populations also breed in Arizona, New Mexico, Colorado, Idaho, and Utah.

Seasonal Status in California

Occurs as a summer resident and migrant, primarily from mid-March to late September. Breeding extends from May (rarely from late April) to mid-August (Williams 1998). All aspects of this account are adapted from an extensive treatment by Williams (1998) and Williams (2002). Only new information is referenced in the text.

Historical Range and Abundance in California

Grinnell and Miller (1944) described martins as fairly common throughout California exclusive of the Great Basin, and Mojave and Colorado deserts. Birds were most common in conifer forests, especially the coast ranges, but also in oak woodlands, riparian woodlands, and increasingly about

human habitations.

In Northwestern California, martins were locally fairly common except the relatively arid eastern portions of the Inner Coast Ranges. Locations of confirmed breeding along the coast included Crescent City, Del Norte County (DN); Eureka and Samoa, Humboldt County (HUM); Mendocino, Mendocino County (MEN); and Gualala, Sonoma County (SON). Representative inland nesting areas included Bridgeville, HUM; Island Mountain, Trinity County (TRI); near Ornbaum Springs, MEN; Glenbrook, Lake County (LAK); at Bohemian Grove, SON; and Napa Valley, Napa County (NAP).

Martins were local and probably uncommon in the Cascade Range where they formerly nested at Weed and Bray, Siskiyou County (SIS); and at the east base of Mt. Lassen and near Bogard Ranger Station, Lassen County (LAS).

Martins were apparently widely scattered through the Modoc Plateau. Nesting sites included west of Goose Lake, Modoc County (MOD); Eagle Lake and Honey Lake, Lassen County (LAS); and in Sierra Valley, Sierra County.

Martins nested throughout most of Central Western California except for the lowlands around San Francisco Bay. Confirmed nesting sites included near Sebastopol, SON; near Olema, Nicasio, Point Reyes, and the coastal ridges of Marin County (MRN); interior Alameda County (ALA); the city of San Francisco; the Santa Cruz Mountains and near Santa Cruz, Santa Cruz County (SCZ); near Pacific Grove, Hastings Reservation, along coastal ridges of the Santa Lucia Range, and upper Salinas Valley, Monterey County (MTY); near Paicines and at Santa Rita Peak, San Benito County (SBT); along the Nacimiento River; near Paso Robles and Santa Margarita, San Luis Obispo County (SLO); and near the Santa Ynez River and nearby Nojoqui Falls, Santa Barbara County (SBA).

Historically, Purple Martins occurred throughout the Central Valley, but were most numerous in the Sacramento Valley. They nested in and near Tehama and Red Bluff, Tehama

County (TEH); Chico, Butte County; near Butte City, Glenn County; Sycamore, Colusa County; and Sacramento, Sacramento County (SAC). Martins were much less numerous in the San Joaquin Valley, where they nested in Stockton, perhaps near Buena Vista Lake, Kern County; and in the San Juan Valley near Shandon, SLO.

Purple Martins formerly bred locally throughout most of the Sierra Nevada. Known nesting areas included Grass Valley, Nevada County (NEV); Lincoln and Auburn, Placer County; Placerville and Peavine Ridge, Eldorado County; Murphys, Calaveras County; near Hodgdon, Tuolumne County (TUO); Coulterville, Mariposa County; and Sequoia National Park, Tulare County (TUL). Martins were found regularly in the Tehachapi Range near Tehachapi, Keene, Fort Tejon, and at Castac Lake.

Purple Martins were once locally numerous in Southwestern California. They nested at scattered locations in the San Gabriel Mountains, Los Angeles County (LA); San Bernardino Mountains, Riverside (RIV) and San Bernardino (SBE) counties; Santa Ana Mountains, Orange County (ORA); San Jacinto Mountains, RIV; and the Palomar, Laguna, and Cuyamaca mountains, San Diego County (SD). In native habitats of the foothills and lowlands, martins bred at Gaviota, SBA; near Santa Paula, Ventura County (VEN); probably near Gardena, LA; and Escondido and San Onofre, SD. From the 1800s to the mid-1900s, martins bred in urban areas of Santa Barbara, SBA; Santa Paula, VEN; Long Beach, Los Angeles, Pasadena, and Whittier, LA; Balboa and Balboa Isle, Santa Ana, and El Modena, ORA; and Escondido, SD.

Recent Range and Abundance in California

The broad outline of martin distribution has not changed dramatically since Grinnell and Miller (1944). Several regional populations, however, have shrunk substantially, and martins are now virtually extirpated from most lowlands, the primary exceptions being from conifer habitats along the immediate coastal slope and Sacramento County.

Purple Martins are more numerous and uniformly distributed in Northwestern California

than anywhere else in the state. They are concentrated near the coast and in the redwood region, but occupy most inland areas except the highest elevations and the eastern Inner Coast Ranges. The Northwestern California population currently totals about 350-800 pairs from 14 counties: Humboldt (150-250), Mendocino (100-200), Del Norte (30-80), Sonoma (25-60), Lake and Napa (each 25-50), Siskiyou and Trinity (each 5-20), Shasta (0-15), Tehama and Glenn (each 0-10), Colusa (0-5), and Yolo and Solano (each 0-2). Martins nest near Lake Earl, DN; W of Yreka and Blue Ridge lookout (1980), southwestern SIS; near Arcata and Shelter Cove, HUM; bridges over Juan Creek and Big River, as well from Ten Mile River to Pudding Creek, MEN; along Fort Ross Rd and at the Gualala River Bridge (since at least 1975) and in nearby snags, SON; near McVicar Audubon Sanctuary at Clear Lake (1989-91), Indian Valley Reservoir, Little Round Mountain, Glenbrook and other sites, LAK; the Geysers area, LAK/SON; in the Putah Creek arm of Lake Berryessa (1 pair in 1993) and east of St. Helena, NAP.

Currently, the martin population in the Cascade Range totals about 35-125 pairs from seven counties: Shasta (25-50), Siskiyou (10-30), Lassen (0-15), Modoc and Tehama (each 0-10), and Butte and Plumas (each 0-5). Recently active breeding sites are along the Pit River arm of Shasta Lake, Lake Britton, and W of Burney (3-4 pairs in 1999), Shasta County (SHA) (B. Williams, pers. obs.); small numbers on The Whaleback, near Orr Lake, Copco Lake, and Temple Rock, central SIS in 1970s-1980s, and recent sightings near Willow Creek Mountain in 2001 (D. Juliano pers. comm.). Surveys at Shasta Lake estimated 17 pairs in 1978, 14 pairs in 1994 and 19 pairs in 1995.

Currently, the Modoc Plateau population totals about 18-80 pairs from six counties: Siskiyou (10-30), Shasta (5-15), Modoc (3-15); Lassen (0-10), and Plumas and Sierra (each 0-5). Since the 1990s, martins are known to nest only at Lava Beds National Monument, SIS; near Happy Camp (3-4 pairs), MOD; the Baum Lake/Crystal Lake area (nests not located); and at Ahjumawi Lava Springs State Park (SP), SHA. They also nested at Eagle Lake (to at least 1992) and nearby Willow Creek Valley (to the 1980s).

Martins in Central Western California are very local and confined to conifer regions, primarily along the immediate coastal slope. Currently, the regional population totals about 100-220 pairs from these counties: Monterey (50-100), Marin (20-40), Santa Barbara (10-30), San Luis Obispo (10-20), Santa Clara and Santa Cruz (10-15 combined), and Contra Costa, Alameda, San Mateo, and San Benito (each 0-5). No martins were found in southern SON during the 1986-1991 atlas period, but have nested along Limantour Rd. and the coastal ridges of Marin County. In the east bay, martins nested near Mt. Hamilton in the 1950s and 1960s and in San Antonio Valley (at least 1969-74 and 1982-83), but no martins were found there during the Breeding Bird Atlas from 1988-92. Sightings in SE Alameda County (June 1995), near Lafayette, Contra Costa County (in the mid-1980s), and ridge near Sunol Ridge, ALA (1990s), indicate probable nesting by isolated pairs. Martins nested near Santa Cruz, Mt. Hermon, and Bonnie Doon through at least the 1950s, at Big Basin Redwoods SP (1977), near Los Gatos, Santa Clara County (1948-49), and other locations in the Santa Cruz Mountains. Currently, martins nest in very small numbers near the crest of those mountains. In Monterey County, most martins nest in the redwood region and along the coastal ridges. The last recorded nesting at Hastings Reservation was in 1956 and at Pacific Grove in 1958. They were also reported nesting in Stony Valley of Ft. Hunter Liggett (in 1966). Nesting locations in Santa Barbara County have been along Foxen Canyon Road (through the 1960s) and the summit of Big Pine Mtn. Andrew Molera SP, MTY; possibly along the Nacimiento River; near Atascadero and along Trout Creek, SLO; and Nojoqui Falls SP and probably along the Santa Ynez River, SBA, may represent the last places where martins nest in sycamore woodland.

Purple Martins are apparently extirpated from all native habitats in the Central Valley. Currently, the only known or suspected nesting in the region is in hollow-box bridges in Sacramento County, where =60-70 pairs nested at four sites as of 1995 and two new sites totaling =6 pairs were located in 1998 (S. Abbott pers. comm.) and 1999 (B. Williams pers. obs.). It is unknown if these represent population increases or relocations, as nest holes were plugged at the

largest Sacramento colony near this time; in either case, the Sacramento population has probably increased since transitioning from buildings in the 1960s. Elsewhere, martins were last reported from the Feather River in the 1970s where they were "uncommon" from at least Honcut Creek to the Bear River (including at Marysville), and "rare" along the Sacramento River from Redding to northern Yolo County (Gaines 1974). Martins do not nest in the San Joaquin Valley, but rare sightings occasionally occur (e.g., one along the San Joaquin River, June 1977)(Williams 1998).

Martins have nested continuously in the Sierra Nevada (*contra* Verner et al. 1980) in very small numbers. Currently, the Sierra Nevada population totals about 10-140 pairs from these counties: Fresno (5-20), Nevada (3-10), Yuba (1-10), Tuolumne (0-15), Lassen, Calaveras, Mariposa, Madera, Tulare, and Kern (each 0-10), and Plumas, Butte, Sierra, Placer, Eldorado, and Amador (each 0-5). Known nesting locations have included Oroville (~1969-1974), near Dobbins (1-2 pairs in 2001), Yuba County, (B. Williams, pers. obs.); W of Grass Valley (J. Olmstead, pers. comm.; Williams, unpubl. data); Auburn (to 1970s, possibly to 1980s); near Jawbone Falls (1984), TUO; Sequoia Lakes, Fence Meadow Ridge, Teakettle Experimental Forest, and near Pine Mountain, FRE.

The Tehachapi Range, with a current population of about 100-200 pairs, may represent the last place anywhere where martins regularly nest in oak woodland. Jesse Grantham saw 30-35 birds in the Tunis Ridge area of Tejon Ranch on 21 May 1982 and estimated 40-100 pairs. Fifty-six nests were found in the Bear Mountain area in 2000, but restricted access has prevented a more complete survey (Williams 2002). Martins were not found where starlings are now abundant but where martins once occurred.

In Southwestern California, martins are very rare in the western Transverse Ranges, and the San Gabriel, San Bernardino, Santa Ana, and San Jacinto mountains; they are most numerous in the Palomar, Cuyamaca, and Laguna mountains. Currently, the regional population totals about 60-160 pairs from eight counties: San Diego (40-75); Riverside (5-20), Los Angeles (5-15), San Bernardino

(5-10), Orange (2-5), Ventura (0-15), and Kern and Santa Barbara (each 0-10). In the San Gabriel Mountains, the only recent nest or sightings come from Chilao (to at least mid-1970s), near Charlton Flat (1986), near Big Santa Anita Canyon and a pair in Powell Canyon (1990), SBE; =1 pair near the East Fork of Hemlock Creek (1989-93), San Bernardino; near Trabuco Peak (1988) and in Leach Canyon (1985), Santa Anas; and near Lake Hemet, San Jacintos. Martins are most numerous in SD, where they are seen frequently in the Palomar Mountains but may be most abundant in the Cuyamacas. Nests have been reported in Cuyamaca SP; the Laguna Recreation Area; at Corte Madera Ranch; and along McGee Rd. (1998). Recent sightings elsewhere include Volcan Mountain in 1993, Hot Springs Mtn (1993, 1998); and near Santa Ysabel and Lake Henshaw. Sycamore-utilizing martins were last reported at Irvine Park in 1962, at O'Neill Park in Trabuco Canyon in 1981, and birds near San Onofre, SD, are probably extirpated. Martins used buildings at Whittier, Balboa Isle, and possibly elsewhere through at least the 1950s.

Ecological Requirements

Martin requirements have been deduced from their distributional patterns and recent studies in habitat selection (Williams 1998, Williams 2002). Common to all nesting areas are concentrations of nesting cavities, relatively open conditions from above, and probably relatively abundant aerial insect prey. Their distribution and abundance is most consistently determined by nest site availability: new locations can be attributed to an increase in nest sites, and local extirpations can usually be attributed to loss of nest sites or competition from starlings. Martins' use of various nest substrates (e.g., boxes, buildings, bridges, utility poles, lava tubes, tree cavities) is suggestive of a habitat generalist, yet martins are very selective of conditions near their nest sites. Common to all sites is low canopy cover at the nest height, typically <20% at 100 m. Also, almost all sites are located in the upper half of the landscape, particularly in mountainous regions. Martins seldom, if ever, use snags along canyon bottoms or with dense vegetation at or above nest height. Their distribution may also be influenced by the availability of aerial insects, perhaps especially large

insects such as dragonflies, which are frequently fed to young (there are, however, no diet studies in the western United States). The importance of insect abundance is suggested because martins are most numerous in relatively mesic regions, at geographic and topographic positions that are likely to concentrate aerial insects, and in or near large bodies of water. A current requirement is that starlings must be absent or uncommon, as martins have not persisted anywhere starlings are numerous.

In conifer regions, martins are concentrated in low- to mid-elevation forests such as redwood, yellow pine, and mixed conifer. Average upper elevations are 5,000-6,000 ft (max = 6,800 ft [2073 m], Big Pine Mtn, SBA). Conifer snags (occasionally dead-top trees and hardwood snags) are the most common nesting substrate, used by probably >70% of the California population. Martins select very large (119 cm median dbh, $n = 29$) and tall (22 m median ht, $n = 29$) trees. Stand-replacing fire is the primary process that creates martin habitat in most regions, both by creating snags and open habitat. In coastal areas, however, martins use remnant redwoods that stand above regenerating forest or are made accessible by logging. Persistence of populations appears to depend on clusters of large snags or individual very large snags that can support multiple pairs.

Concentrations of very large trees, primarily valley oaks and sycamores, are common to almost all woodland nesting sites. Valley populations have almost all disappeared, however, mostly because of starlings. Martins persist in the Tehachapi Range where large oaks occur at relatively high elevations and in prominent positions.

Systematic data have not been collected where martins nest under bridges, but they do have several features in common. None are over freeways or high-speed roadways; all are in the open and substantially elevated from the ground; and starlings are either absent or relatively uncommon, including in Sacramento.

In the Modoc Plateau, martins nest in collapsed lava tubes. There are no data on these

features, but it is likely that martins respond to opening size, depth, surrounding vegetation height, landscape position, etc.

Threats

Post-fire salvage logging, removal or attrition of large trees, and fire suppression are the primary threats to martins in the majority of their range. Rates of stand-replacing fire (both pre- and post-settlement) are probably sufficient to create widespread habitat for martins if large trees are not removed. Increasing regulation and awareness of the importance of snags and residual large trees may help, but such policies often apply only to lower topographic positions and not to ridges where safety considerations, including fire hazards, may exempt potential nest trees from protection (T. Jimmerson, pers. comm.). A trend toward prevention of stand-replacing fire by using prescribed burns and/or mechanical thinning could theoretically provide some habitat for martins, although net gains are unlikely as such policies may also reduce tree-killing fires.

Competition from starlings is the main threat to remnant populations in lowland woodlands, making recolonization of most areas unlikely. Incremental loss of sycamore woodland is a long-term threat. Developments may cause local increases in starlings.

No major threats are known for martins in other habitat types. My casual observations suggest, though, that collapsed lava tubes most frequented by people may not be used by martins. It is not known if martins avoid these caves because of human use or for other reasons. Martins in bridges are susceptible to changes in construction design, nesting prevention (see above), and possibly elevated nestling mortality due to the ease with which young fall out of the nest (Williams 1998).

Management and Research Recommendations

- Do not log extensive areas of trees killed by stand-replacing fire on public lands. On private lands, logging may benefit martins if large snags are left.

- Allow the recruitment of very large trees, especially on upper slopes, ridges, and distant from habitats that support numbers of starlings.
- Investigate the relative importance of different fire regimes in providing martin habitat; research in Sierra San Pedro Martir, Baja California, may be valuable.
- Retain large trees in oak and sycamore woodlands; establish reserves where possible.
- Investigate how land use decisions may reduce starlings and their impact on martins.
- Study the effect of bridge design on nest success of martins.
- Study characteristics of lava tubes used by martins, including human visitation rates
- Establish a nest box program that includes the maintenance necessary for long-term occupation; success is most likely near the lagoons and bays of the north coast.
- Western Purple Martin Working Group

Monitoring Needs

Martins are not adequately sampled by any existing monitoring strategies. Martins are best inventoried by area-searches. Low-level aerial surveys should be explored, especially in the redwood region, as potential nest trees are usually widely scattered yet conspicuous. Martins are social, and adaptive cluster sampling is recommended if complete coverage of an area is not possible. GIS is an ideal tool for monitoring as it could catalogue nest sites, identify potential habitat (e.g., large fires on the upper half of the landscape, if digitized fire data are available), and explore landscape attributes which seem to be important to martins. Inventories of vulnerable lowland populations are particularly needed, including at Lava Beds National Monument and bridge sites.

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